CONTRIBUTING FACTORS FOR SUCCESSFUL IMPLEMENTATION OF EROSION AND SEDIMENT CONTROL PLAN IN MALAYSIA

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STUDENT'S DECLARATION

I hereby declare that the work in this thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Malaysia Pahang or any other institutions.

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ABSTRAK

Pencampuran air dan tanah dapat memberikan impak yang besar kepada alam sekitar. Oleh itu, Pelan Kawalan Hakisan dan Mendapan (ESCP) adalah perlu untuk mengurangkan kesan buruk dari pengangkutan mendapan dari tapak kerja ke kawasan luar tapak kerja. Kajian ini bertujuan untuk mengkaji faktor-faktor untuk melaksanakan ESCP dengan jayanya di Malaysia dengan menentukan cabaran-cabaran yang lazim untuk melaksanakan ESCP dan mengenal pasti faktor-faktor untuk melaksanakan ESCP dengan jayanya. Cabaran umum untuk melaksanakan ESCP boleh dibahagikan kepada dua (2) iaitu cabaran dalaman dan cabaran luar. Selain itu, faktor kejayaan untuk melaksanakan ESCP boleh dikategorikan kepada empat faktor: fokus strategik, orang, operasi, dan kewangan. Kajian ini akan menimbulkan kesedaran, pengetahuan, dan kepentingan ESCP, meningkatkan kadar kejayaan pelaksanaan ESCP di Malaysia, dan membantu dalam membuat keputusan dan menangani masalah yang berkaitan dengan pelaksanaan ESCP.

ABSTRACT

The mixing of water and soil can give a significant impact to the environment. Therefore, Erosion and Sediment Control Plan (ESCP) is necessary to reduce the adverse effects of sediment transport from on-site to off-site areas. This study aims to investigate the factors for implementing ESCP successfully in Malaysia by determining the common challenges for implementing ESCP and identify the factors for implementing ESCP successfully. The common challenges for implementing ESCP can be divided into two (2) which are internal challenges and external challenges. Furthermore, the successful factor implementing ESCP can be categorized into four factors: strategic focus, people, operations, and finances. This study will create awareness, knowledge, and importance of ESCP, improve the rate of success of implementation ESCP in Malaysia, and help in the decision making and tackle the problem related to the implementing of ESCP.

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LIST OF SYMBOLS

LIST OF ABBREVIATIONS

WEQ	Equation of Wind Erosion
USLE	Equation of Universal Soil Loss
RUSLE	Revised Universal Soil Loss Equation
BMPs	Best Management Practices
ESCP	Erosion and Sediment Control Plan
DOE	Department of Environment
DID	Department of Irrigation and Drainage

CHAPTER 1

INTRODUCTION

1.1 Background Study

Erosion is the detachment of a portion of the soil profile of the soil surface that can be caused by the impact of raindrops or water shear forces flowing through the surface of the soil. Before deposit, soil particles can be transported. Transport and deposition are referred to as sedimentation. Erosion and sedimentation are natural processes that occur every day throughout the country as a result of wind and waters. However, the effect of natural erosion is usually only noticeable on a geologic time scale. The effect of natural erosion is usually noticeable only on a geological time scale, however. Soil or surface disturbance, including activities such as construction, agriculture or logging, can significantly increase the amount of sediment loss from the site as a result of erosion (Price and Karesh, 2000). This change can increase the risk of flooding, alter hydrology and destroy the hydric vegetation. Dislocated soil particles are often stored in depressions in the land, but during storm events can be dislocated. The amount of silt or sediment delivered to water systems through the transmission, transport and deposition processes depends on changes in surface drainage patterns, ground roughness, vegetation and weather conditions. Sediments can also smother fish or amphibians nesting sites or cover mussel beds that filter substantial amounts of water pollutants that eventually become our drinking water (Price and Karesh, 2000).

The prediction of erosion is a powerful tool used since the 1940s by soil conservationists. Most agricultural conservation plans are carried out using the empirical equation of wind erosion (WEQ) and the empirical equation of universal soil loss (USLE) for sheet and rill erosion. The USLE is being extensively revised and updated, leading to a revised RUSLE which available by the end of 1990. The Revised Universal Soil Loss Equation (RUSLE), is used to calculate the amount of soil loss from a site such as a

climate, soil erodibility, topography, and land use. The phasing and sequencing of surface disturbance activities in the workplace reduce total erosion and reduces the amount of sediment to be controlled by other means (Price and Karesh, 2000).

The most variable factors in determining erosion are site topography, ground cover and the implementation of best management practices (BMPs). Erosion and sediment control are controlled by three types of BMPs. The first control is the erosion prevention practices. This type of BMP emphasizes ground cover that prevents any type of erosion. The second type is called runoff management control, which is intended to prevent further erosion in flowing water. The final type of BMPs is sediment control practices that try to prevent soil particles from leaving the site and entering streams or rivers that are already carried in storm waters. It is important to note that a particular BMP can be a practice of erosion prevention or sediment control, or it can serve both purposes at the same time. BMPs can reduce the amount of sediment that leaves the site, but no single practice is 100% effective (Price and Karesh, 2000).

ESCP can be seen as a combination of BMPs and RUSLE equation, consisting of leaving original vegetation whenever possible and restoring vegetative cover as soon as possible, as well as sediment controls, such as clean water diversions, silt fences, and sediment basins, can prevent the loss of sediment from a building site (or any other site) during most storm events.

The erosion and sediment control plan (ESCP) is a plan that details temporary measures to be implemented during the construction phase and may include permanent measures that will remain in place once the development of erosion and sedimentation has been completed. An effective ESCP objective is to prevent controllable erosion and minimize adverse sediment effects of sediment transport from on-site to off-site areas. ESCP consist of three (3) phase which is the planning phase, design phase, and construction phase. In the planning phase, more source of the information needed for the ESCP because this is the first step and the decision making a phase for ESCP is also made at this phase by the normal review process with the Local Authority such as DID. Next, in the design phase, the design should consider for permanent structural water quality control measures are provided in the "Guideline for Erosion and Sediment Control in Malaysia by the Department of Irrigation and Drainage (DID)". This section also discusses how the planning and construction phase can be incorporated with little

additional effort beyond normal project design activities. Finally, the construction phase, during the construction phase, there are three ESCP activities: bidding and mobilization, construction and complete construction.

In Malaysia, it is compulsory to perform the ESCP in any construction and there are the "Guideline or Erosion and Sediment Control in Malaysia' provided by the Department of irrigation and drainage (DID) that needs to be followed. This guideline will complement the existing Department of Environment (DOE) Guidelines (1996) in listing out Best management practices (BMPs) and demonstrate their appropriate use in the control of erosion and sedimentation in construction sites. The BMP that have been installed need to be checked periodically and maintained sufficiently to ensure proper performance by implementing the inspection and maintenance plan that has been prepared in the Environment Impact Assessment (EIA) report.

1.2 Problem Statement

There are some issues of implementation ESCP in practice. As an example is the bauxite problems in Pahang, the area around Bukit Goh, Gebeng and Pelabuhan Kuantan are pollutants with bauxite because they not implement ESCP properly. They should construct a wash through section at the site entrance as a remover to dirt and other sediments from the tires of vehicles as they leave the work site.

Moreover, Landslide at Cameron highland due to logging. Logging will make the bond between the soil at the slope being reduce and make the soil exposed to erosion. The landslide occurs because they did not implement the ESCP. They should lay the Erosion Control Blanket to limiting sediment runoff, where will protect the soil from erosion which can cause the landslide.

Next, Flash flood at Kuala Lumpur. In this case, they take the ESCP for granted, so that the sediment from the worksite enters the drainage. Therefore, the drainage becomes shallow and when the heavy rain comes the drainage cannot transport the water effectively and caused a flash flood. They should encircle their site by silt fence. The synthetic, geotextile design of the fence fabric allows for water to seep through, but retain the soil, sediment, and other debris.

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